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ABSTRACT

Some local governments in nonmetro areas--especially those in the rural West and in very rural areas--experienced high levels of fiscal stress in the mid-seventies that were associated with high and rising local taxes. These local governments may be forced to cut back their rural development activities in the eighties. Fiscal pressures on local governments were assessed by looking at locally raised revenues as a percentage of local income from 1972-1977. Areas with both high and rising revenue effort experienced the most fiscal pressure. Over 33% of the totally rural areas not adjacent to metro areas had both high and rising local government revenue effort, in contrast to only 16% of the less rural nonmetro areas. Efforts to raise revenues increased in about half of the totally rural areas during the mid-seventies. The high cost of providing essential government services in isolated areas may explain why these areas experienced the greatest fiscal pressure. The varying fiscal condition of local governments is an important issue to Federal and State policymakers in the design and implementation of rural development policies. An appendix presents a multiple regression analysis designed to identify and separate imperfections in the measure of revenue effort. (Author/PM)

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United States Department of Agriculture

Economic Research Service

Rural Development Research Report Number 51

Rural Governments

Raising Revenues and Feeling the Pressure

Richard J. Reeder

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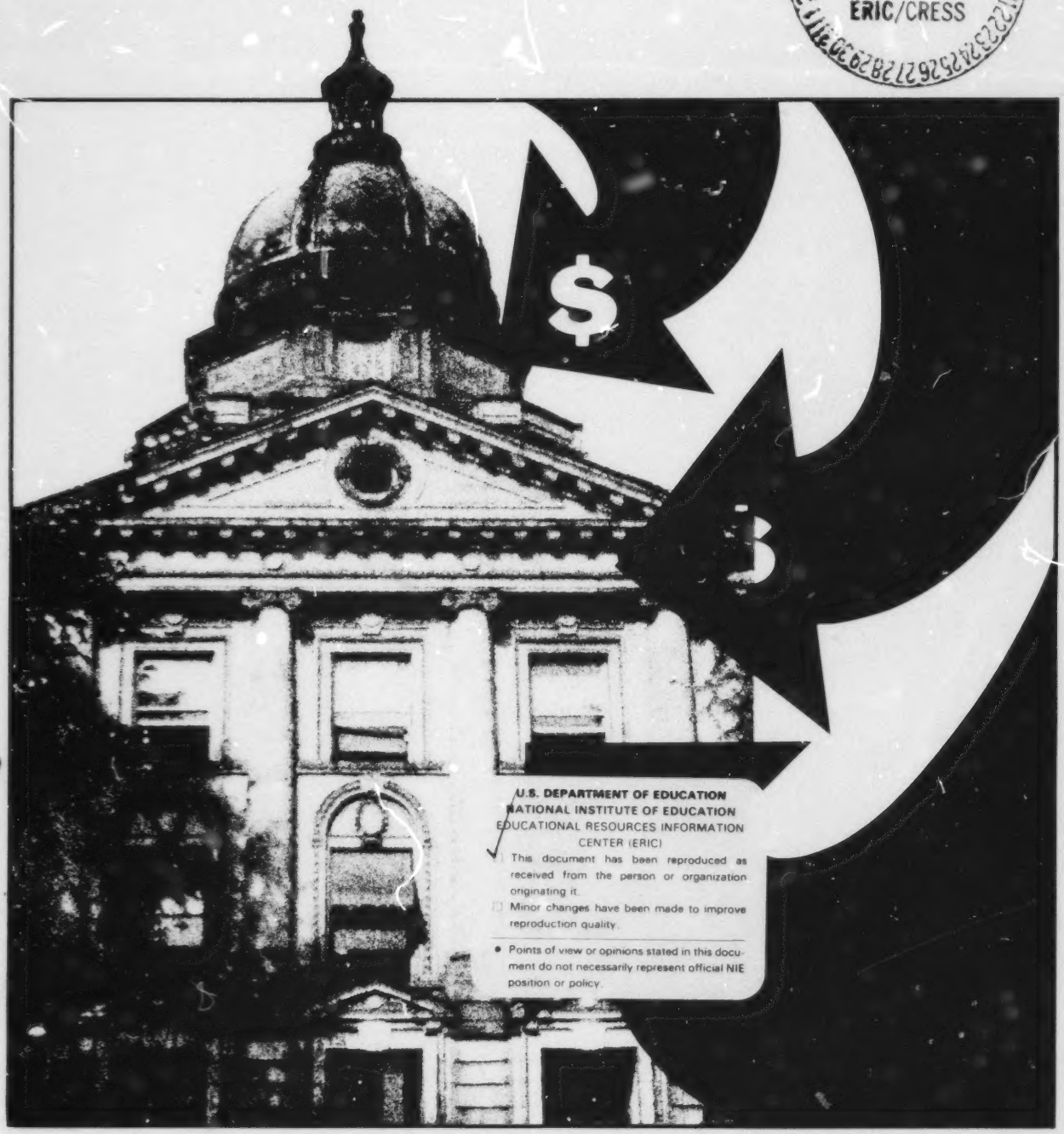

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Rural Governments: Raising Revenues and Feeling the Pressure, by Richard J. Reeder, Economic Development Division, Economic Research Service, U.S. Department of Agriculture. Rural Development Research Report No. 51.

ABSTRACT

Some local governments in nonmetro areas--especially those in the rural West and in highly rural areas--experienced high levels of fiscal stress in the midseventies that were associated with high and rising local taxes. These local governments may be forced to cut back their rural development activities in the eighties. This report looks at locally raised general revenues as a percentage of local income to assess the fiscal pressures local governments face in their efforts to raise revenues. Such revenue efforts increased in many rural areas whose income and population declined. The high cost of providing public services in sparsely populated areas contributed substantially to rural fiscal pressure.

Keywords: Fiscal stress, local government finance, rural development, tax effort, tax burden, fiscal trends, fiscal conditions, rural local governments.

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SUMMARY

Some local governments in nonmetro areas--especially those in the rural West and in very rural areas--experienced high levels of fiscal stress in the midseventies that were associated with high and rising local taxes. These local governments may be forced to cut back their rural development activities in the eighties. However, most local governments entered the eighties in sound financial condition.

This report assesses fiscal pressures on local governments by looking at locally raised revenues (taxes and user fees) as a percentage of local income. It identifies those nonmetro areas most affected by such fiscal pressure. It measures fiscal pressure by examining both the level of local government revenue effort in 1977 and whether that level rose or fell from 1972 to 1977. High (above average) revenue effort indicates local tax burdens were heavy in 1977. Rising revenue effort indicates tax rates increased in 1972-77. Areas with both high and rising revenue effort experienced the most fiscal pressure.

Over 33 percent of the totally rural areas not adjacent to metro areas had both high and rising local government revenue effort, in contrast to only 16 percent of the less rural nonmetro areas. Efforts to raise revenues increased in about half of the totally rural areas during the midseventies, particularly in areas where income and population fell. The high cost of providing essential government services in isolated, sparsely populated areas may explain why totally rural areas experienced the greatest fiscal pressure.

Over a third of nonmetro counties in the West suffered fiscal strain from high and rising revenue effort. Nonmetro areas in the South also faced fiscal strain associated with rising revenue effort, but taxes there were lower than in other regions.

Differences in tax exporting and importing (shifting taxes to nonresidents--such as local property taxes paid by nonresident landowners), the division of responsibilities between State and local governments, the degree to which public services are provided by volunteers or the private sector, community preferences, and incomes make any comparison of revenue effort extremely difficult. For example, tax-exporting and tax-importing activities often exaggerate revenue effort in the rural West and in highly rural areas.

The varying fiscal condition of local governments is an important issue to Federal and State policymakers in the design and implementation of rural development policies. Monitoring fiscal stress indicators, such as revenue effort, is one way policymakers can appraise the fiscal pressure of local governments in rural areas.

Rural Governments

Raising Revenues and Feeling the Pressure

Richard J. Reeder

INTRODUCTION

Local governments played an increasingly important role in promoting rural economic development in the seventies. Between 1972 and 1977, per capita spending by nonmetro local governments grew 68 percent--an increase of 12 percent after adjustment for inflation (13, p. 47). 1/ Local government spending stimulated local economies and provided public services needed to accommodate growing rural populations. Although the growth of local government was important to rural development, raising revenues to finance it augmented fiscal stress in many rural local governments.

This report identifies those rural places which are feeling the pressure of revenue-raising activities by local governments. The midseventies, 1972 to 1977, were the most recent years for which data from the U.S. Census of Governments were available for nonmetro counties. I use two indicators to measure the fiscal pressure associated with raising revenues: the level of revenue effort in 1977 and the change in revenue effort from 1972 to 1977. I measure revenue effort as the percentage of local income taken in the form of local government taxes and user charges. 2/

The fiscal pressure resulting from efforts to raise local government revenues may have several effects. First, higher tax rates increase the cost of living for residents and increase the cost of doing business for rural firms. The economic wellbeing of the community may decline as a result, and inmigration of people and firms may be discouraged. 3/ In the long run, therefore, higher taxes may reduce the potential tax base available to local governments. Second, higher taxes can reduce the flexibility of local government budgets because they bring local government revenues closer to legal tax limitations. Because local governments are legally required to maintain balanced budgets, binding tax limitations can prevent a locality from responding effectively to recessions, floods, and other emergencies requiring increased expenditures.

1/ Underscored numbers in parentheses refer to items in the references at the end of the report.

2/ Revenue effort includes only general revenues; it excludes utility and liquor store receipts so one can more easily compare different localities. Federal and State aid are also excluded.

3/ This result may not occur if higher taxes allow the local government to increase important government services whose benefits are perceived as greater than their costs.

Third, higher taxes can heighten political resistance to additional government spending. If taxpayers perceive taxes as unjustly high, they may press for tax rate reductions or restrictive tax limitation requirements, sometimes forcing local governments to cut back on essential services. Fourth, taxpayers may react to higher taxes by voting down bond referenda required to raise funds for much needed infrastructure.

One can view revenue effort as a comprehensive local tax rate, thus interpreting it as an indicator of either local revenue burden or fiscal strain. The change in revenue effort is of interest because the phenomenon of rising tax rates adds to perceived tax burdens. Thus, two communities may have the same tax rates; however, if the first community's rates have risen recently while the second community's rates have remained stable, the tax burden is more noticeable in the first community. Trends in revenue effort also indicate the direction of change in fiscal condition. Thus, a pattern of rising revenue effort indicates the potential for fiscal stress in the future.

In this report, I compare revenue effort in different types of rural areas. I distinguish six categories of nonmetro counties according to their degree of rurality and metro-adjacency. Three degrees of rurality are defined for nonmetro counties: (1) totally rural--fewer than 2,500 urban residents; (2) less urbanized--2,500-19,999 urban residents; and (3) urbanized--20,000-50,000 urban residents. 4/ A nonmetro county may be considered either adjacent or nonadjacent to metro areas. It is considered adjacent if it is contiguous to one or more metro counties and if at least 1 percent of its residents commute to the central city (or cities) of metro counties for employment; otherwise, it is considered nonadjacent. 5/

I used Census tapes containing local government revenue data for U.S. county areas, including the revenues of all levels of local governments located within the county (county, municipalities, towns, townships, school districts, and special districts), to compute the national averages for various types of rural areas. 6/ To show regional variations, this study gives revenue effort indicators for the four Census regions. Besides describing variations in rural and regional efforts, I discuss some of the fiscal implications of these variations and examine potential distortions in the measure of revenue effort.

REVENUE EFFORT

Revenue effort is one of a group of effort variables commonly used to indicate fiscal pressure. In this study, revenue effort is computed as the percentage

4/ Nonmetro counties are those outside Standard Metropolitan Statistical Areas (SMSAs) as defined by the Office of Management and Budget for 1977. In States with no county government jurisdictions, I use Census-defined "county areas" as substitutes. Urban residents in nonmetro areas are defined as the population that resides in incorporated and unincorporated towns and cities of at least 2,500 inhabitants.

5/ This report uses the categorization scheme used by Hines and others (5, p. 4), but I have updated it using 1977 Standard Metropolitan Statistical Area definitions.

6/ The revenue effort statistics presented in this report are unweighted averages representing the average U.S. county area (excluding Alaska) within any given category. Local government revenue data are from the Bureau of the Census; local resident personal income data are from the Bureau of Economic Analysis, U.S. Department of Commerce.

of local resident income which is raised in the form of local taxes, user charges, and fees. Revenue effort indicates the pressure (or burden) of taxes and user charges on local tax bases. Thus, one should distinguish revenue effort from measures of fiscal capacity and fiscal need which are also of interest, but do not measure fiscal pressure (8).

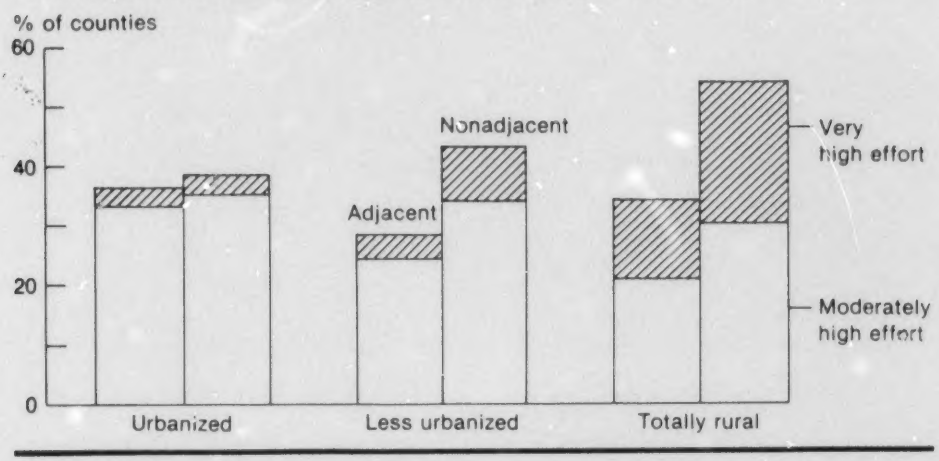
Empirical studies of local fiscal stress often examine revenue effort. Effort variables are important in policymaking because Federal and State programs use them when distributing aid to local governments. 7/ Many nonmetro areas with relatively high revenue effort are likely to experience fiscal stress. To identify the rural and regional characteristics of these places, I distinguish among three levels of effort: very high, moderately high, and low. 8/ Very high effort is heavily concentrated in totally rural areas (fig. 1). In 1977, 25 percent of totally rural nonadjacent areas fell into the very high effort category. Totally rural adjacent areas ranked second, with 13 percent of counties having very high effort. Nine percent of less urbanized nonadjacent areas had very high revenue effort, while only 3 percent of urbanized nonmetro areas had very high effort.

7/ The General Revenue Sharing (GRS) program is the largest and best-known program using an effort variable in its aid distribution formula (14). Effort factors are also used in various programs for State aid to local governments. The Advisory Commission on Intergovernmental Relations identified 13 States which use effort, capacity, or some other fiscal factor to distribute aid to local governments (12, pp. 6-7).

8/ Areas with very high effort are nonmetro counties with revenue effort one standard deviation or more above the average for nonmetro counties. Areas with moderately high effort have effort less than one standard deviation above the nonmetro average. Areas with low effort have effort below the nonmetro average. The nonmetro average in 1977 was 6.3 percent of income (excluding Alaska); the nonmetro standard deviation was 3.8 percent of income. Thus, areas with very high effort had effort greater than 10.1 percent of income. Areas with moderately high effort had effort between 6.3 and 10.1 percent of income. Low effort areas had effort less than 6.3 percent of income.

Figure 1

Percentage of Counties with High Effort, by Type of Rural Area, 1977



Describing variations in rural revenue effort is easier than explaining them. The theory which may best explain these variations is the size economies theory, which maintains that there are optimal community population size and density where the per capita costs of providing public services are minimized. 9/ Below this point, per capita costs increase as population size and density decrease. Although empirical evidence in municipal studies is not conclusive on this subject, this theory fits the observed variations in revenue effort well (4). According to this theory, lightly populated places, such as totally rural areas, have suboptimal population size and density and can be expected to have relatively high costs for providing public services. The high cost of providing police protection or busing students to rural schools, for example, would cause small, lightly populated communities to have higher revenue effort and greater fiscal pressure than large, more densely populated communities providing the same public services.

Metro-adjacent areas are more likely to have low revenue effort than nonadjacent areas. This difference between adjacent and nonadjacent areas occurs mainly in totally rural and less urbanized areas. About 66 percent of adjacent totally rural areas had low effort, compared with only 47 percent for nonadjacent totally rural areas. Over 70 percent of adjacent less urbanized areas had low effort, compared with only 56 percent of nonadjacent less urbanized areas. Urbanized areas do not differ between adjacent and nonadjacent areas.

This distinction may also be explained by the size economies theory. Because of their small population, less urbanized and totally rural areas may find it economical to rely extensively on neighboring metropolitan governments for many public- and private-sector services. This tendency may explain why adjacent areas have lower revenue effort than nonadjacent areas which lack this alternative. Urbanized adjacent areas, in contrast, may have sufficient population to provide their own services economically, which may explain why urbanized adjacent areas are as likely to have low revenue effort as urbanized nonadjacent areas.

Totally rural areas show greater fiscal diversity. 10/ Although relatively few totally rural areas have low revenue effort, the average effort for totally rural, low effort counties is less than 4 percent of resident personal income, substantially lower than the average for urbanized and less urbanized areas (table 1). 11/ In contrast, the average effort for totally rural, very high effort counties is almost 15 percent of income--substantially higher than the average for less rural areas.

Why do totally rural areas exhibit such diversity? One explanation is that because revenue effort is related to income, the diverse income situations of totally rural areas may lead to diverse fiscal conditions. A second

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9/ In this report, size economies refer to economies related to both population size and population density.

10/ The coefficient of variation for totally rural areas is double that for less rural areas.

11/ This situation explains why the average revenue effort for totally rural adjacent areas (6.0 percent of income) is less than that for less urbanized nonadjacent areas (6.3 percent of income). Although the totally rural adjacent category has a larger proportion of counties with very high effort (13 percent of counties versus 9 percent of counties), about 66 percent of totally rural adjacent counties have low effort, averaging only 3.7 percent of income.

Table 1—Revenue effort level for nonmetro county areas, 1977 1/

Area	Low effort		Moderately high effort		Very high effort		All areas	
	Share of counties	Average effort	Share of counties	Average effort	Share of counties	Average effort	Share of counties	Average effort
	Percent							
Urbanized adjacent	64	4.6	33	7.7	3	11.6	100	5.8
Urbanized nonadjacent	62	4.5	35	7.4	3	11.7	100	5.7
Less urbanized adjacent	72	4.4	24	7.6	4	11.7	100	5.4
Less urbanized nonadjacent	56	4.4	34	7.8	9	12.3	100	6.3
Totally rural adjacent	66	3.7	21	7.8	13	14.4	100	6.0
Totally rural nonadjacent	47	3.9	30	8.0	24	15.0	100	7.7
Regions:								
Northeast	52	4.6	41	7.7	8	13.2	100	6.5
North Central	48	5.0	40	7.7	12	12.6	100	7.0
South	79	3.8	16	7.6	5	15.7	100	5.0
West	30	4.7	42	8.0	28	14.4	100	8.8
All nonmetro	60	4.2	29	7.8	11	13.9	100	6.3

1/ Effort equals local government taxes and user charges (excluding utility and liquor store receipts) expressed as a percentage of local resident personal income.

explanation is that variations in economic base and government responsibilities can lead to diverse fiscal conditions (these factors are discussed in detail later in this report). Another explanation is that other factors, including local attitudes toward public services, may vary widely among totally rural areas and cause revenue effort to vary. Because totally rural counties are more numerous in some regions than others, some of the observed statistical differences between totally rural and less rural areas may merely reflect more general regional differences. 12/

The West is the region most characterized by very high revenue effort (fig. 2). About 28 percent of Western nonmetro counties had very high effort, more than twice the 12-percent frequency of counties with very high effort in the North Central region and more than five times the 5-percent frequency of counties with very high effort in the South. Over 50 percent of the nonmetro counties in the Northeast had low (lower than average) revenue effort, while almost 80 percent of the Southern nonmetro counties had low effort. The South exhibited the greatest contrast between high and low efforts. Revenue effort in Southern areas with very high effort averaged 15.7 percent of income, whereas effort in Southern areas with low effort averaged only 3.8 percent of income.

12/ Over a third of the Nation's totally rural counties are located in the North Central region.

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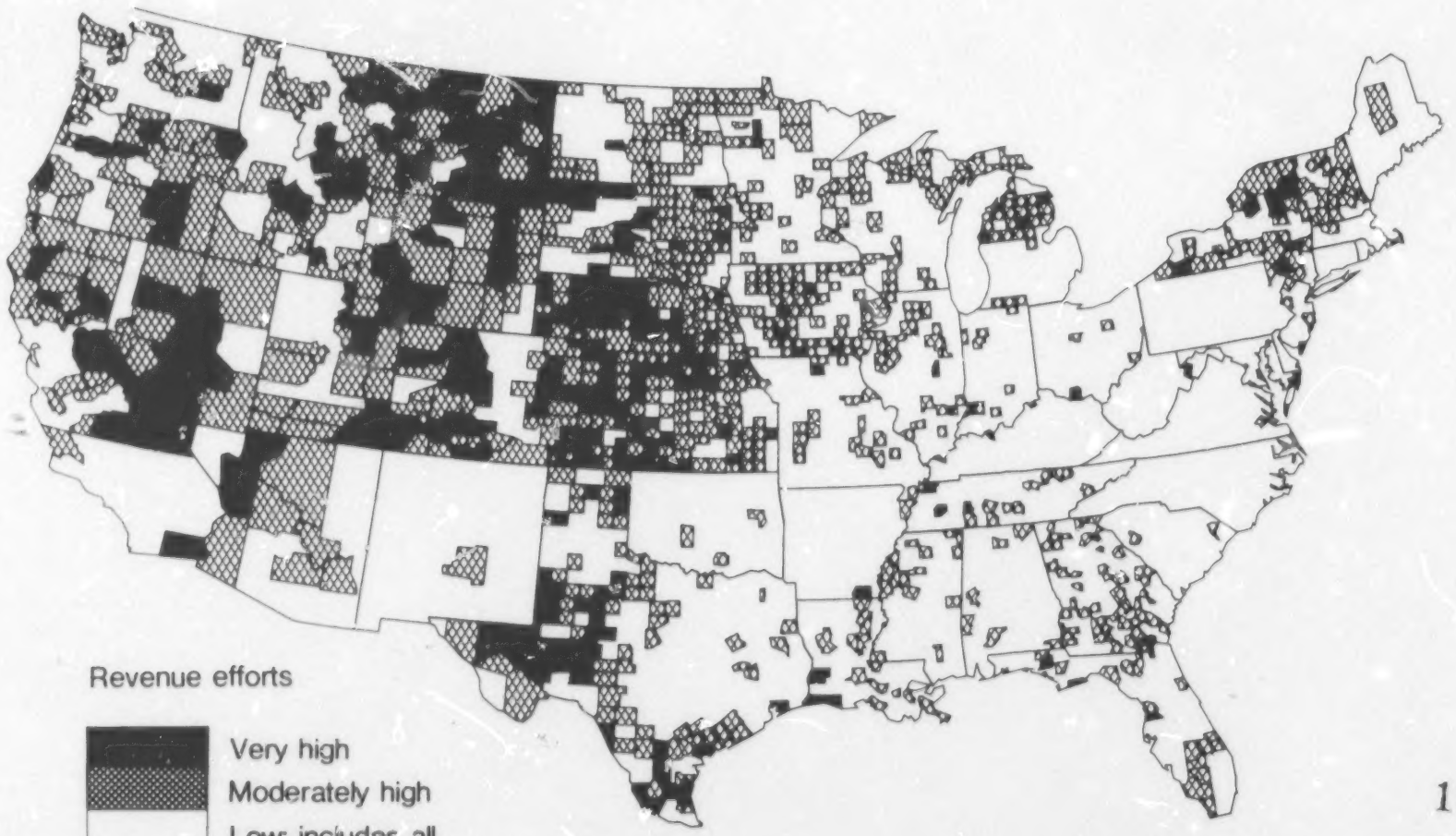
Figure 2

Nonmetro Counties with High Revenue Efforts in 1977



Income differences may explain some regional differences. Because of population size economies, lightly populated rural areas in the West are expected to have higher revenue effort than are the more densely populated areas of the rural South. Political and socioeconomic factors may account for some differences. Differences in the allocation of responsibilities among State and local levels of government could also lead to regional differences.

Regardless of the source of regional effort differences, the magnitude of these differences is large, making this topic worthy of further research.

TRENDS IN REVENUE EFFORT

Public reaction to growing taxes may have contributed to California's Proposition 13 and other recently created fiscal restraints. Although such legislation may reduce tax burdens, it also reduces the fiscal flexibility of local governments. Some rural areas are more likely to experience tax resistance than others. Places with rapidly growing revenue effort are more likely to be subjected to new tax limitations or to be constrained by existing limitations. Because new tax limitations often follow a period of rising tax burdens, examining trends in revenue effort in the seventies may help identify fiscal trouble spots in the eighties.

Although the percentage of personal income going to local governments declined in most nonmetro counties from 1972 to 1977, revenue effort rose in 39 percent of nonmetro counties; 6 percent had rapidly rising effort, whereas the other 33 percent had slowly rising effort (table 2). 13/

Rapidly rising effort was generally more prevalent and rose more rapidly for totally rural and nonadjacent areas than for less rural and adjacent areas. About 14 percent of totally rural nonadjacent areas had rapidly rising revenue effort, with an average increase of about 7 percent of income (fig. 3). Only 1 percent of urbanized adjacent areas had rapidly rising revenue effort, with an average increase of less than 3 percent of income.

Taxpayers in less urbanized areas were most likely to benefit from reduced fiscal pressure during the midseventies. About two-thirds of less urbanized areas had declining effort. Metro-adjacent areas were more likely to have declining effort than nonadjacent areas, regardless of their degree of rurality. Although least likely to have declining effort, those totally rural nonadjacent areas with declining effort had the largest average decline, 1.6 percent of income. Thus, totally rural nonadjacent areas exhibit much fiscal diversity, with both the largest average increase in revenue effort for areas with rapidly rising effort and the largest average decrease in revenue effort for areas with declining effort.

The West was most affected by rapidly rising revenue effort (fig. 4). Although 3-6 percent of counties in the other three regions had rapidly rising effort, 13 percent of Western counties demonstrated this form of fiscal pressure. The South also showed signs of unusual stress related to rising revenue effort.

13/ The standard deviation for the change in effort (including both increases and decreases) for nometro areas was 2.7 percent of income during this period. Counties whose revenue effort rose by at least 2.7 percent of income are defined as having rapidly rising effort. Counties whose effort rose during the period, but by less than 2.7 percent of income, are defined as having slowly rising effort.

Table 2—Revenue effort trends, for nonmetro county areas, 1972-77 1/

Area	Declining effort		Slowly rising effort		Rapidly rising effort		All areas	
	Share of counties	Average change in effort	Share of counties	Average change in effort	Share of counties	Average change in effort	Share of counties	Average change in effort
	Percent							
Urbanized adjacent	66	-0.9	33	0.8	1	2.9	100	-0.3
Urbanized nonadjacent	61	-1.1	37	.8	2	3.7	100	-.3
Less urbanized adjacent	67	-1.3	32	.8	2	4.0	100	-.5
Less urbanized nonadjacent	64	-1.3	32	.8	4	4.5	100	-.4
Totally rural adjacent	56	-1.2	33	.9	11	5.5	100	.2
Totally rural nonadjacent	51	-1.6	35	1.0	14	6.9	100	.5
Region:								
Northeast	62	-1.0	35	.8	3	4.2	100	-.2
North Central	69	-1.6	25	1.0	6	4.7	100	-.6
South	56	-1.1	39	.8	5	7.0	100	.0
West	54	-1.2	33	1.0	13	6.2	100	.5
All nonmetro	61	-1.3	33	.9	6	5.9	100	-.1

1/ Change in effort equals 1977 effort minus 1972 effort.

Figure 3

Percentage of Counties with Rising Revenue Effort, 1972-77 by Type of Rural Area

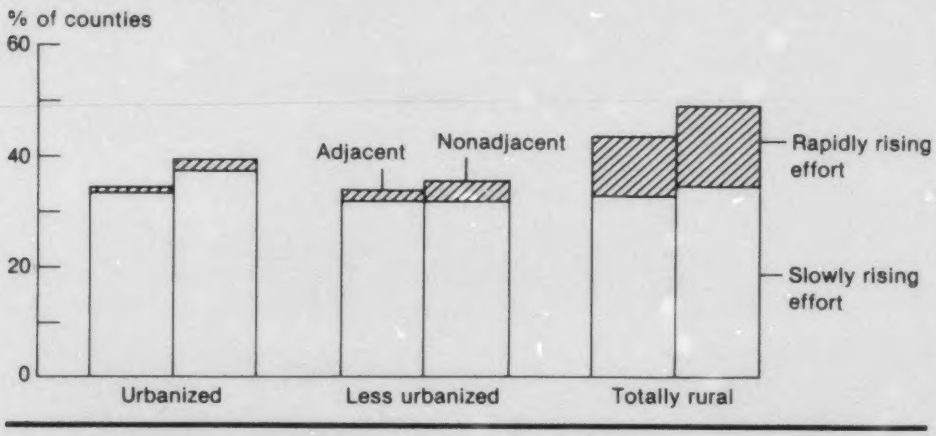


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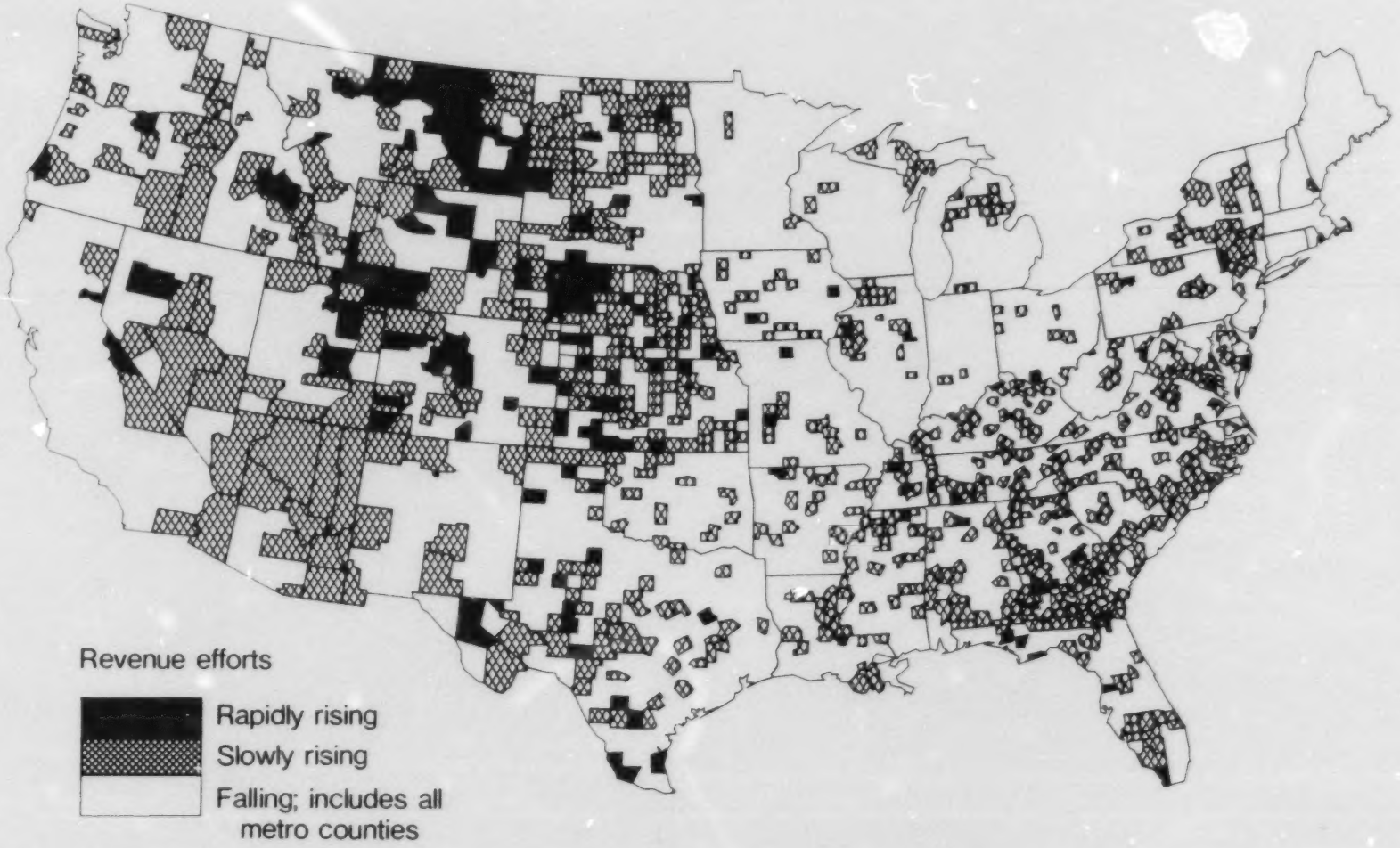
Figure 4

Nonmetro Counties with Rising Revenue Efforts, 1972-77



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Although only 5 percent of Southern counties had rapidly rising effort, the average increase in effort for these counties was 7 percent of income, more than that in other regions. In addition, 39 percent of Southern counties had slowly rising effort, more than that in other regions. In contrast, declining effort was most evident in the North Central region, where almost 70 percent of the counties had declining effort. The average decline in these counties was 1.6 percent of income, more than that in other regions.

Effects of Population Change

The relatively large average increase in revenue effort for rapidly growing regions such as the South and West raises an important question. Is rising revenue effort an expected public service response to population growth? This question is important not only for what it implies about the cause of rising revenue effort but also for what it implies about the significance of rising revenue effort as an indicator of fiscal pressure. If revenue effort is shown to rise as a normal response to nonmetro population growth, then rising revenue effort may signify progress rather than indicate fiscal difficulty.

Population growth might be associated with rising revenue effort for several reasons. To accommodate new firms and industries locating in nonmetro areas, local governments often must increase their revenues to finance new public infrastructure. When government revenues and expenditures grow more rapidly than do local tax bases, revenue effort rises, causing fiscal stress in extreme cases (9, p. 17). Rising revenue effort may also be related to the characteristics of new migrants to rural areas. Because recent migrants often come from cities where more public services are provided, they may demand more public goods and services than do long-term residents, boosting revenue effort.

However, there is a strong argument for associating rising effort with population decline. Because some government costs cannot be reduced from one year to the next (fixed costs), governments losing population may be unable to cut costs proportionately. As a result, government revenue effort in the short run is expected to rise as population falls. In the long run, governments may reduce their fixed costs in declining areas, but revenue effort may still rise because of diseconomies associated with smaller population size and density (3, p. 22).

To assess the relationship between trends in revenue effort and population growth and decline, one may calculate these trends for various population categories. In this report, I examine three population change categories: (1) declining areas, (2) stable areas, and (3) growing areas. 14/ Among nonmetro counties that lost population during the midseventies, the average revenue effort did not change. Average effort declined 0.2 percent of income in the stable population category (table 3). In growing counties, revenue effort declined only 0.1 percent of income on average. These overall differences are slight, but they suggest that population decline contributes more to fiscal pressure than does population growth, whereas stable population appears to reduce fiscal pressure.

Specific types of rural areas exhibited more pronounced differences. Effort in declining, totally rural areas increased on average about 0.8 percent of

14/ Declining areas were those where population declined by 2 percent or more from 1972 to 1977. Stable areas neither grew nor declined by more than 2 percent. Growing areas grew 2 percent or more.

Table 3—Trends in revenue effort for nonmetro areas, by population change 1/

Area	Declining population		Stable population		Rising population		All areas	
	Share of counties	Average change in effort	Share of counties	Average change in effort	Share of counties	Average change in effort	Share of counties	Average change in effort
				Percent				
Urbanized adjacent	10	-0.3	22	-0.3	67	-0.3	100	-0.3
Urbanized nonadjacent	14	-.1	23	-.7	63	-.2	100	-.3
Less urbanized adjacent	11	-.8	23	-.6	66	-.5	100	-.5
Less urbanized nonadjacent	15	-.6	25	-.7	60	-.2	100	-.4
Totally rural adjacent	9	.8	19	.1	72	.2	100	.2
Totally rural nonadjacent	23	.8	17	.9	60	.3	100	.5
Region:								
Northeast	11	-.2	27	.1	62	-.4	100	-.2
North Central	23	-.5	30	-.5	47	-.7	100	-.6
South	11	.5	17	-.1	71	.0	100	.0
West	9	1.7	13	.6	79	.3	100	.5
All nonmetro	15	.0	22	-.2	63	-.1	100	-.1

1/ Change in effort equals 1977 effort minus 1972 effort.

income, while effort in growing, totally rural areas increased on average 0.2-0.3 percent of income. Differences between declining and growing areas were greater for rural areas in the West, where average effort rose 1.7 percent of income for declining counties compared with 0.3 percent for growing counties. Thus, population decline, rather than population growth, is associated with rising effort in the West, the region where revenue effort rose most.

Effects of Income Change

The fact that both growing and declining areas in the West had rising revenue effort suggests that factors other than population change are associated with rising effort in the West. One such factor is income change. An increase in the income level of a community can be associated with either an increase or a decrease in revenue effort. For example, an increase in income can be indirectly associated with rising revenue effort if higher incomes lead residents to demand substantially more public services. 15/ However, it may take some time before these demands raise government expenditures. Moreover, if the

15/ Some empirical studies of the income elasticity of demand for public services support this hypothesis (1, pp. 91-94).

increase in income is viewed as only a temporary fluctuation, demands for public services are not likely to rise. In fact, such an increase in income would directly reduce the effort ratio, at least in the short run, because it increases the denominator of the revenue effort ratio. This argument implies that a decrease in income will increase revenue effort, at least in the short run.

Such an inverse relationship between effort and income trends occurred during 1972-77. Revenue effort increased 2.0 percent of income for the average nonmetro county in the declining income category, and it decreased 0.4 percent of income for the average county in the growing income category (table 4). 16/

Income effects were particularly large for totally rural nonadjacent areas, where revenue effort rose 2.4 percent of income for declining income counties and declined 0.1 percent of income for growing income counties (fig. 5). Moreover, income decline was quite common in these areas; 24 percent of totally rural nonadjacent counties were in the declining income category.

16/ Declining income areas were those where real per capita income declined by 2 percent or more from 1972 to 1977. Stable income areas had real per capita incomes which neither grew nor declined by more than 2 percent. Growing income areas had real per capita income growth of 2 percent or more.

Table 4—Trends in revenue effort for nonmetro county areas, by income change 1/

Area	Declining income		Stable income		Rising income		All areas	
	Share of counties	Average change in effort	Share of counties	Average change in effort	Share of counties	Average change in effort	Share of counties	Average change in effort
	Percent							
Urbanized adjacent	2	0.5	2	1.0	95	-0.4	100	-0.3
Urbanized nonadjacent	2	.7	3	.6	95	-.3	100	-.3
Less urbanized adjacent	2	.7	4	.3	94	-.6	100	-.5
Less urbanized nonadjacent	5	1.1	5	.3	89	-.5	100	-.4
Totally rural adjacent	12	2.2	8	.6	80	-.1	100	.2
Totally rural nonadjacent	24	2.4	9	-.1	66	-.1	100	.5
Region:								
Northeast	6	.8	8	.2	86	-.3	100	-.2
North Central	14	1.5	6	-.3	80	-1.0	100	-.6
South	3	2.7	4	.8	92	-.1	100	0
West	17	2.9	11	.2	72	-.2	100	.5
All nonmetro	9	2.0	6	.2	85	-.4	100	-.1

1/ Change in effort equals 1977 effort minus 1972 effort.

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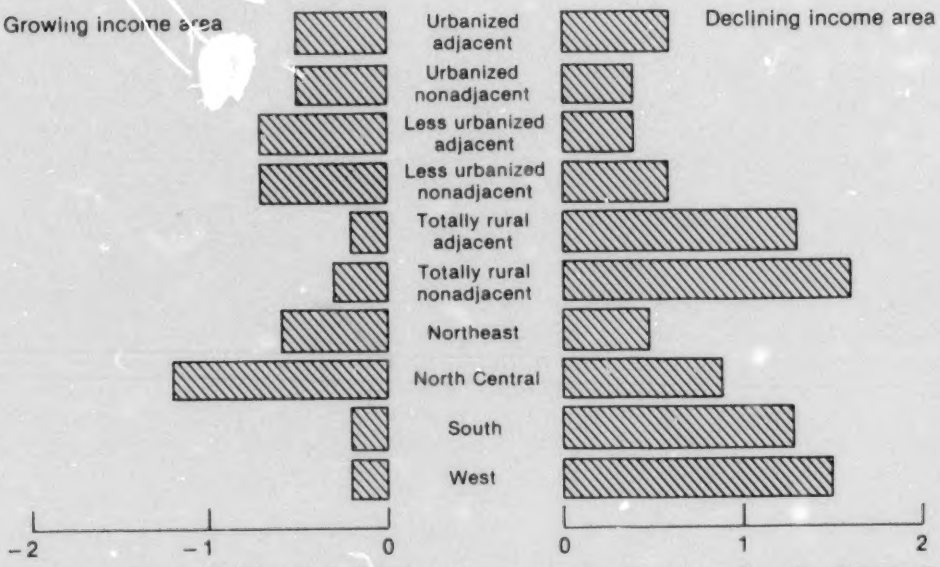
Figure 5

Average Change in Effort 1972-77, by Income Growth/Decline Category and Rural and Regional Area



The North Central and Western regions were affected most by income changes. In the North Central region, 80 percent of the nonmetro areas were in the growing income category, with an average decrease in revenue effort of 1.0 percent of income. This figure contrasts with a 1.5-percent increase in effort for declining income areas in the North Central region. In the West, a relatively large proportion of nonmetro counties--17 percent--were in the declining income category, with an average increase in revenue effort of 2.9 percent of income. This figure contrasts to a 0.1-percent decline in effort for growing income areas in the West.

The finding that rising revenue effort in totally rural areas and in Western nonmetro areas is associated with income decline--and to a lesser extent with population decline--may refute the notion that rising revenue effort reflects improving socioeconomic conditions associated with the rural turnaround. This finding demonstrates that rising revenue effort implies growing fiscal pressure, at least for the 1972-77 period. 17/

17/ This conclusion leaves open the possibility that over a longer period rising effort may reflect socioeconomic improvements related to population and income growth.

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PLACES WITH HIGH AND RISING REVENUE EFFORT

Fiscal pressure may be most troublesome when a county has both high and rising revenue effort. 18/ In 1977, 40 percent of nonmetro counties had high revenue efforts; 39 percent had rising effort from 1972 to 1977. 19/ If we combine these two factors, we find that 22 percent of nonmetro counties containing 16 percent of nonmetro population had both high and rising revenue effort. Average effort for these counties was 10.5 percent of income, more than 4 percentage points above the average for all nonmetro counties. The increase in revenue effort over the 1972-77 period for the average county with high and rising effort was 2.5 percent of income. In contrast, effort declined by an average of 0.1 percent for all nonmetro counties (table 5).

18/ This method of measuring fiscal pressure is similar, but not identical, to that which the Advisory Commission on Intergovernmental Relations used when it employed the level and change in "adjusted" tax effort to indicate a "fiscal blood pressure" for the 50 States (11).

19/ In this case, "high" means higher than the average effort for all nonmetro counties. The average effort for all nonmetro counties (excluding Alaska) was 6.3 percent of income. A county is judged to have rising effort if its effort increased in absolute value from 1972 to 1977, which occurs whenever own general revenue rises relative to local income.

Table 5—Nonmetro county areas with high and rising efforts 1/

Area	Nonmetro county areas with high and rising efforts					
	Counties	Share of counties	1977 population	Share of Population	Average effort, 1977	Average increase in effort, 1972-77
	Number	Percent	Thousands	Percent		
Urbanized adjacent	26	16	1,922	16	8.3	1.1
Urbanized nonadjacent	24	16	1,240	15	8.3	1.4
Less urbanized adjacent	83	20	2,184	16	8.3	1.4
Less urbanized nonadjacent	151	21	2,260	17	9.2	1.6
Totally rural adjacent	53	21	326	13	11.8	3.6
Totally rural nonadjacent	201	34	971	23	12.5	3.6
Region:						
Northeast	28	24	1,727	25	9.5	1.3
North Central	225	26	2,593	15	9.9	1.9
South	157	14	2,976	13	9.9	3.1
West	128	37	1,615	23	12.4	3.0
All nonmetro	538	22	8,912	16	10.5	2.5

1/ The statistics provided here refer to counties having revenue effort above 6.3 percent of income—the nonmetro average in 1977—and having an increase in revenue effort from 1972 to 1977. Percentage of counties and percentage of population statistics relate high and rising effort counties to all counties within a geographic area.

The most distressed category is the totally rural nonadjacent category. Over a third (34 percent) of these areas had high and rising revenue effort, more than double the percentage of counties with high and rising effort in less rural areas (fig. 6). These distressed totally rural nonadjacent areas had the highest average effort (12.5 percent of income); they tied with totally rural adjacent areas in having the highest average increase in effort (3.6 percent of income). However, the incidence of counties with high and rising effort is clearly lower among adjacent, totally rural counties. Only 21 percent of these counties (containing only 13 percent of the population of all totally rural adjacent areas) are fiscally distressed. There was no such dramatic difference between adjacent and nonadjacent areas in urbanized and less urbanized nonmetro areas.

Regional variations are equally striking. The incidence of high and rising effort among nonmetro counties is highest in the West and lowest in the South; 37 percent of Western nonmetro counties had high and rising revenue effort (fig. 7). Areas in the West had particularly high levels of revenue effort, averaging 12.4 percent of income. The South had relatively few counties with high and rising effort (13 percent), but these counties had the highest average increase in effort, 3.1 percent of income from 1972 to 1977.

Although roughly a quarter of the nonmetro counties in the Northeast and North Central regions had high and rising revenue effort, the average increase was less than that in other regions. The Northeast had the largest share of nonmetro population residing in areas of high and rising revenue effort (25 percent), but it had the lowest average effort for these fiscally distressed areas.

IMPERFECTIONS IN THE MEASURE OF REVENUE EFFORT

When assessing the significance of geographical differences, one must recognize that revenue effort is an imperfect indicator of fiscal pressure. In this section, I examine some of the imperfections which are most likely to affect fiscal comparisons among types of rural areas and among regions.

Figure 6

Percentage of Counties with High and Rising Effort by Type of Rural Area, 1977

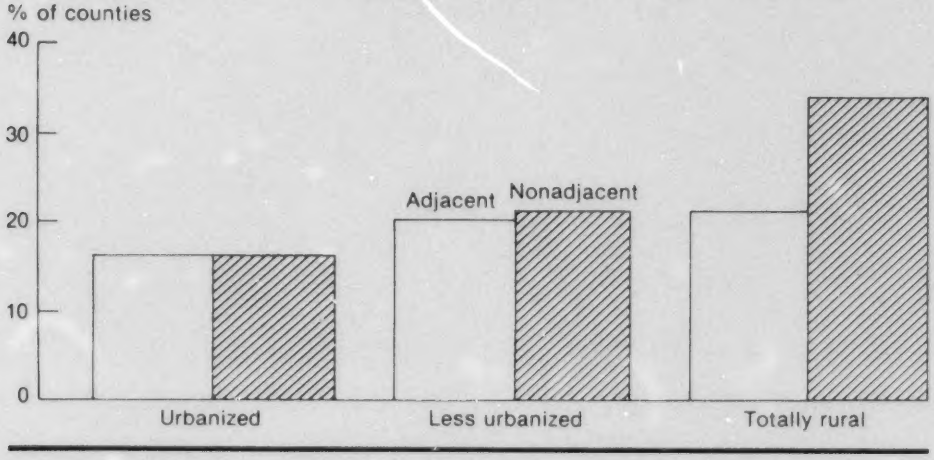

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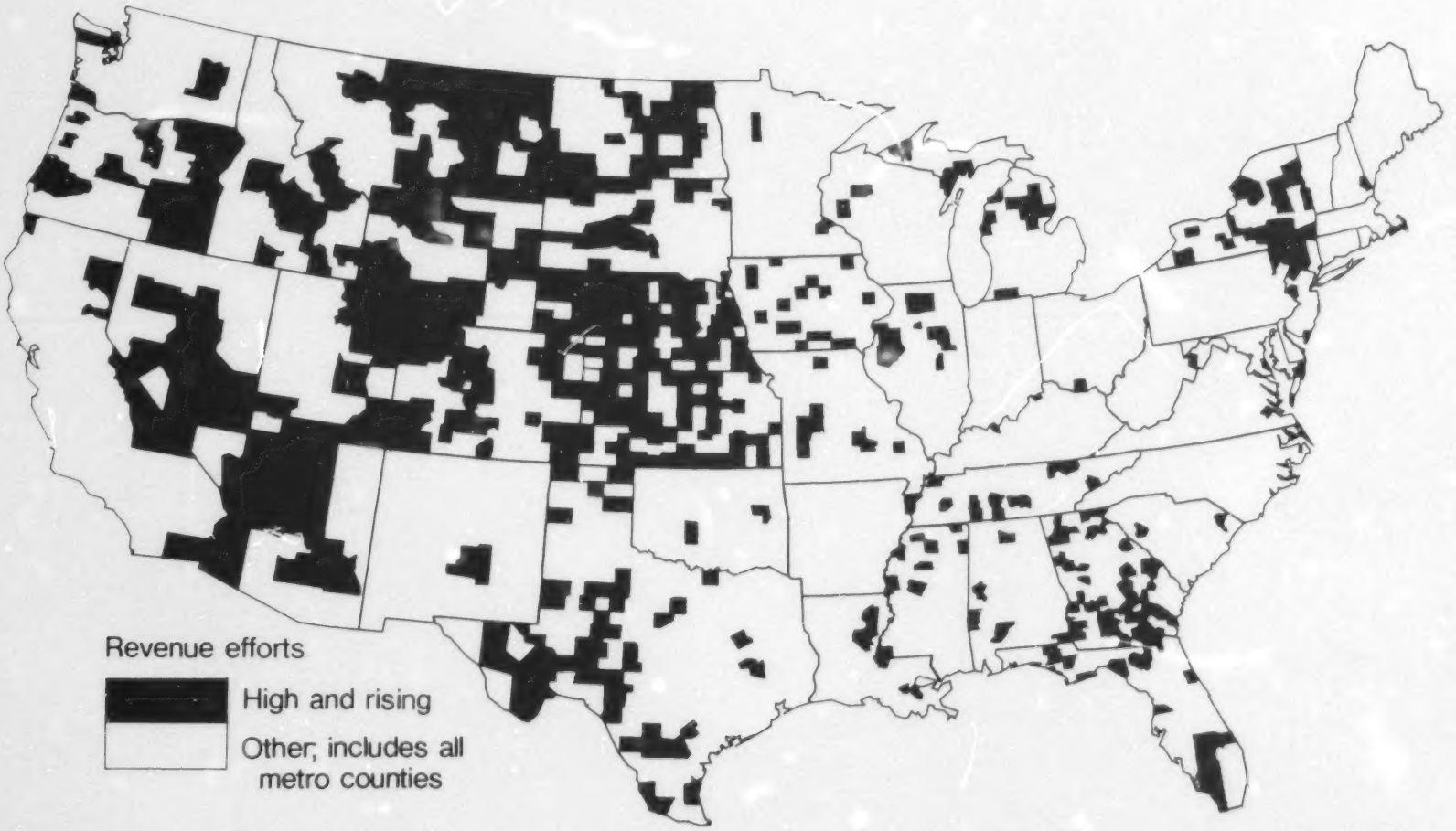
Figure 7

Nonmetro Counties with High and Rising Revenue Efforts, 1972-77



Local Government Responsibilities

Comparisons of revenue effort among localities can be misleading when local government tax and spending responsibilities differ substantially. A local government with extensive fiscal responsibilities will probably have higher revenue effort than one with narrow responsibilities. However, a community with fewer local government responsibilities does not necessarily experience less fiscal pressure because, when a local government does not assume fiscal responsibility, local residents must often pay for such services in other ways. Revenue effort does not count these public service costs to the community; hence, the measure is imperfect since it understates the fiscal pressure for counties with fewer local government responsibilities.

Some communities rely heavily on the private sector to provide specific services, whereas other communities rely on local government. Trash collection is an example. Other factors being equal, local revenue effort is higher in a community where government employees collect trash than in a community where private firms provide this service directly to residents. Note that, although revenue effort differs, the cost to both types of communities may be the same. Consequently, when revenue effort between the two types of communities is compared, the fiscal pressure on communities relying heavily on private-sector service delivery will be understated by local revenue effort.

Another problem in comparing local responsibility concerns government use of volunteer labor. Some rural communities make extensive use of volunteer labor for fire protection. Revenue effort in these communities is expected to be lower than in others because local government revenues do not reflect the cost of volunteer effort. But, if other factors are equal, the actual effort of both communities is similar. Only the form of the effort (paid versus not paid) differs. Hence, revenue effort understates the pressure on communities making heavy use of volunteers.

Comparisons of local government effort may also be misleading when interstate variations in the functional responsibilities of State and local governments are significant. For example, local revenue effort will be lower in States where the State government provides local roads than in States where this responsibility is left to local governments. But, if other factors are equal, the total cost of local roads to local residents should be similar in both types of States; only the breakdown between State and local taxes would differ. Hence, fiscal pressure is understated by local revenue effort in States providing a large share of public services to local areas.

Lacking data on government use of volunteer labor and privately provided services, one can only speculate on the effect of these factors on revenue effort. Conventional wisdom suggests that volunteer labor is more prevalent in highly rural areas; thus, one might expect revenue effort to understate the actual effort of these areas. However, economic considerations such as population threshold levels suggest that highly rural areas rely on private-sector provision of public services less than other rural areas, causing government revenue effort to overstate fiscal pressure. The net effect of these two factors on interlocal comparisons of revenue effort is not obvious.

One can get some idea of the regional nature of the comparability problem associated with differing State assignments of functional responsibility by examining State government shares of total State and local revenues in each

State. 20/ The South is the region most characterized by high State revenue responsibility (fig. 8). All but two Southern States had high (above average) State revenue-raising responsibility in 1977. This fact implies that fiscal pressure is understated by local revenue effort in the South. This tendency for local government to have less responsibility in the South than in other regions may partly explain why the South has less revenue effort. In contrast, almost half the Western States had low (below average) State revenue raising responsibility. This statistic tends to inflate local revenue effort in the West, exaggerating the difference between the West and the South.

This imperfection in the measure of revenue effort is particularly noticeable when most counties in one State have high effort while most counties in a neighboring State have low effort. For example, the absence of counties with high effort in Maine and New Mexico is conspicuous, given the high effort in neighboring States (fig. 2). When compared with neighboring States, Maine and New Mexico have extremely high State revenue responsibility--66 percent and 78 percent, respectively. These and other examples suggest that comparisons of local revenue effort among States can be misleading.

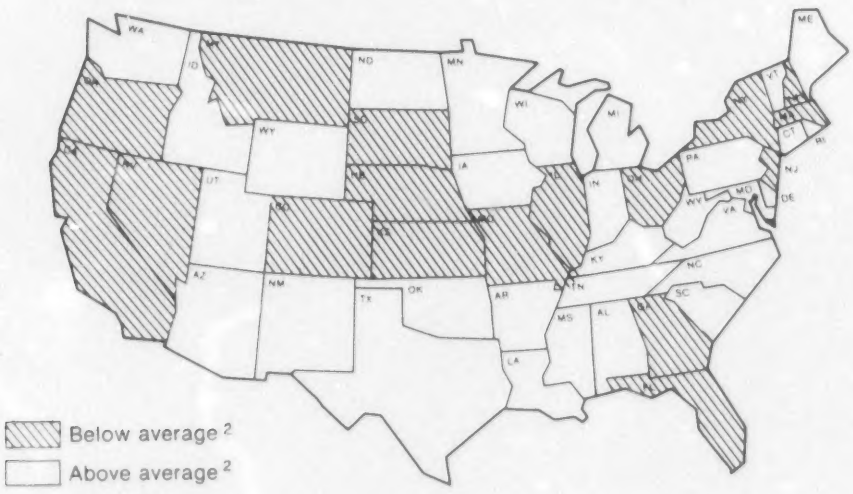
Low-Income Communities

Going back to Adam Smith, economists have argued that a proportional tax system is unfair because it applies a constant tax rate to all income classes, which overburdens low-income individuals who have little income available for paying

20/ This is only one of a number of possible indicators one could choose to represent State versus local responsibilities. For other examples, see (2, pp. 33-35).

Figure 8

State Revenue Responsibility, 1977[1]



[1] Percentage of State-local own general revenues raised by State governments in FY 1977.
[2] U.S. average = 45.7 percent.

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taxes after spending most of their income on subsistence (7, p. 95). According to this logic, a progressive tax system, which applies progressively higher tax rates with increasing income levels, is prescribed to distribute the tax burden equitably among rich and poor. A similar argument can be made that revenue effort as a proportional measure of fiscal burden understates the fiscal pressure on low-income communities compared with high-income communities (6, pp. 75-76). Because of this problem, the Federal General Revenue Sharing formula uses both tax effort and relative income to distribute funds to fiscally distressed areas (14, pp. 4-7).

A logical result of this difficulty with measuring revenue effort is that, other things being equal, rich communities can maintain higher revenue effort than poor communities--without necessarily incurring greater fiscal pressure. Presumably, such differences in income-related effort reflect limitations of the revenue effort measure rather than real differences in fiscal pressure. One can get a rough idea of the potential significance of this limitation by examining average revenue effort for high-, medium-, and low-income counties. The average effort for nonmetro counties in the low-income category (1977 per capita income less than $5,000) was 5.6 percent of income in 1977. Medium-income counties (per capita income between $5,000 and $7,000) had a higher average effort, 6.6 percent. High-income counties (per capita income greater than $7,000) had the highest average effort, 7.6 percent. Assuming this pattern does not result merely from greater preferences for public goods in higher income communities, these figures suggest that fiscal pressure may be substantially understated by revenue effort for low-income areas. 21/

This distortion appears greater for some types of rural areas than for others. All six categories of rural areas exhibited lower average effort in low-income areas than in medium- and high-income areas (table 6). However, the magnitude of this income effect on revenue effort varies substantially, depending on the type of rural area. For adjacent areas, the average difference in revenue effort between low- and high-income areas is about 1.5 percent of income. For nonadjacent areas, this difference varies by degree of rurality; it is over 4 percent of income for totally rural areas, over 2 percent for less urbanized areas, and only 0.5 percent for urbanized areas.

The distortion associated with low incomes appears to cause the differences in fiscal pressure between totally rural, less urbanized, and urbanized areas to be understated by observed revenue effort. Figure 9 compares effort among nonadjacent rural areas within three income classes. Regardless of the income level, totally rural areas have distinctly higher revenue effort on average than do urbanized areas. However, in the low-income class, the difference in effort between totally rural and urbanized areas is smaller, and there is little difference between less urbanized and totally rural areas. 22/

21/ Because high-income communities tend to be better educated, the argument that high-income communities may have acquired greater preferences for public goods and services than low-income communities may be justified. However, there is also good reason to believe that low-income communities would prefer public goods, such as health, education, and welfare assistance, over nonsubsistence private goods.

22/ One possible explanation for this pattern is that totally rural areas with low incomes may have to forgo some important government services that are normally provided by totally rural areas with high incomes. Because of economies of scale, the cost of providing these services may be cheaper in urbanized areas, allowing both rich and poor areas to provide them.

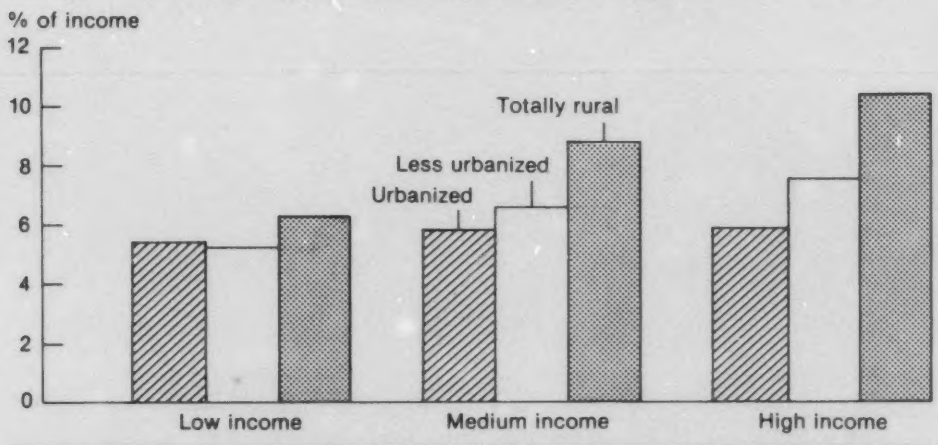
Table 6—Revenue effort levels for nonmetro county areas, by income category 1/

Area	Low income		Medium income		High income		All areas	
	Share of counties	Average effort	Share of counties	Average effort	Share of counties	Average effort	Share of counties	Average effort
	Percent							
Urbanized adjacent	10	5.0	72	5.8	18	6.3	100	5.8
Urbanized nonadjacent	12	5.4	77	5.8	12	5.9	100	5.7
Less urbanized adjacent	28	4.9	62	5.5	10	6.3	100	5.4
Less urbanized nonadjacent	33	5.3	56	6.6	11	7.5	100	6.3
Totally rural adjacent	53	5.0	41	7.1	6	6.4	100	6.0
Totally rural nonadjacent	51	6.3	39	8.8	10	10.5	100	7.7
Region:								
Northeast	13	6.5	82	6.4	5	9.0	100	6.5
North Central	20	6.7	64	7.0	16	7.3	100	7.0
South	53	4.6	41	5.2	5	7.4	100	5.0
West	24	10.1	60	8.4	15	8.6	100	8.8
All nonmetro	35	5.6	54	6.6	11	7.6	100	6.3

1/ Effort equals local government taxes and user charges (excluding utility and liquior store receipts) expressed as a percentage of local personal income.

Figure 9

Average Effort of Nonadjacent Areas, by Income and Type of Rural Area, 1977



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Over half the totally rural counties have low incomes, whereas only about 10 percent of urbanized counties have low incomes (table 3). Therefore, fiscal pressure is more likely to be understated in totally rural areas than in urbanized and less urbanized areas. Hence, this income-related distortion appears to understate substantially the gap in fiscal pressure between highly rural and less rural areas.

For the same reason, comparisons are probably distorted when revenue effort in different regions is compared. Over half the Southern rural counties had low incomes; their average effort was 4.6 percent of income, well below the average, suggesting that because of low income, revenue effort understates considerably fiscal pressure in the South. Other things being equal, the effort difference between the West and the South will be exaggerated.

Tax Exporting

Tax exporting occurs when a jurisdiction imposes taxes which are largely passed on to taxpayers residing in other jurisdictions, thus enabling the tax-exporting jurisdiction to substantially increase its revenues without unduly pressuring its residents. For example, many rural areas export part of their property taxes to nonresident property owners, such as urban residents who own cottages or other property in rural areas and who pay property taxes to rural jurisdictions (10, p. 38). In farming areas where nonresident-owned farms are common, residents may export part of their property tax burden through taxes on these farms. Local property taxes on multicounty mining, timber, and power companies can bring additional property tax revenues into local jurisdictions, without necessarily boosting taxes for local residents.

Jurisdictions can also use nonproperty taxes to export local tax burdens to nonresidents. Tourist areas export motel and restaurant taxes to visitors. Regional shopping towns export local sales taxes to residents of surrounding areas. 23/ Using local sales taxes and user fees, farming areas may shift part of their taxes to migrant farmworkers, and border towns may shift taxes to aliens. 24/ These exported taxes also inflate the measured local revenue effort, overstating the fiscal strain on the community. 25/ Because exported taxes are included in local revenue effort, the measures of revenue effort substantially overstate the fiscal pressure on residents of some lightly populated areas which get a large proportion of their revenues from exported taxes. This situation probably causes fiscal pressure to be overstated most in the West, the region characterized to the greatest degree by lightly populated areas with extensive mining and other resource-extraction industries owned by nonresident corporate stockholders.

The reverse of tax exporting is tax importing, a phenomenon probably affecting metro-adjacent rural areas more than nonadjacent rural areas. Tax importing occurs when residents of a community pay taxes to other jurisdictions.

23/ Part of the business property taxes on retail establishments may also be passed on to nonresidents in the form of higher retail prices.

24/ Property taxes can also be passed on to migrant farmers in the form of higher charges for food and shelter provided by farm operators.

25/ State government taxes represent an important exception. Although exported State taxes exaggerate State revenue effort, they may actually depress local revenue effort if the revenues from a State government tax, such as a severance tax on coal which is exported to residents of other States, are shared with local jurisdictions.

Commuters residing in adjacent nonmetro areas may pay substantial local sales taxes, excise taxes, highway and transportation user charges, and other taxes to the metro jurisdictions where they work. Tax importing also occurs when rural residents visit or shop in neighboring metro areas and pay taxes, such as local sales and excise taxes, during their visits. Because these taxes are borne by rural residents but are not counted in rural revenue effort, local revenue efforts are expected to understate fiscal preassure for metro-adjacent areas.

Findings of Regression Analysis

Multiple-regression analysis is a statistical procedure used here to estimate the independent effects of region and degree of rurality on local revenue effort. By including variables representing three kinds of measurement imperfections--local government responsibility, income level, and tax-exporting factors--one can statistically separate the effects of these variables from the effects of region and rurality. This separation enables more meaningful comparisons of revenue effort among regions and rural types.

The statistical appendix of this report presents an analysis of several regressions. Each regression includes regional and rural identification variables (dummy variables). The analysis focuses on how the estimated effects (coefficients) of these variables change when distortionary effects are netted out by the addition of tax exporting, income level, and government responsibility variables to the regression.

Because direct tax data on the extent of tax exporting are unavailable, I use economic base variables to represent tax exporting. The percentage of local employment in mining, farming, retail, and other potential tax-exporting activities are used as tax-exporting indicators. Metro-adjacency (a dummy variable) represents potential tax importing from metro areas. Per capita income represents local income level. A variable measuring the State government share of State and local revenues represents local government responsibilities.

I computed the regressions using 1977 data for all nonmetro counties, excluding Alaska. I concluded that the revenue effort differences among regions and types of rural areas were statistically significant after the effects of distortionary factors were netted out of effort comparisons. However, some significant distortions were identified.

The economic base indicators associated with tax exporting were statistically significant in adding to the revenue effort of nonmetro local governments. The largest addition to revenue effort (and, therefore, the largest potential distortion) is associated with farming areas thought to export taxes to nonresident farmowners and workers. 26/ Tax exporting was also indicated for mining and retail employment variables, which had a statistically significant positive effect on revenue efforts. 27/ Metro-adjacency had a statistically significant negative effect on revenue effort, which indicates tax importing.

26/ The economic base variable used to represent these farming areas is nonproprietor farm labor as a percentage of total local employment. This variable is probably associated with nonresident-owned farms using hired farmworkers or with farms using nonresident migrant workers.

27/ Note that the mining variable was also positively associated with rising effort in regressions computed for the change in effort between 1972 and 1977.

The regression coefficients for regional and rural variables change when tax-exporting and -importing variables are added to the regression. Analysis of the changes in these coefficients suggests that tax exporting and tax importing cause revenue effort to considerably overstate the fiscal pressure on residents of Western counties. This distortion is partly offset by the distortion associated with differing State revenue responsibilities which depresses the effort of Western and Southern counties. Differences in tax exporting (and importing) and government responsibilities cause revenue effort to exaggerate the fiscal pressure in totally rural areas. However, this distortion is mitigated somewhat by low income which depresses revenue effort in totally rural areas. The fiscal pressure in the South is similarly understated by local revenue effort because of the depressing effect of low incomes in the region.

The net effect of these distortions is that simple comparisons of revenue effort probably exaggerate the variations in fiscal pressure among regions and types of rural areas. The regression analysis suggests that about half of the effort gap between regions (West versus South) and about a third of the gap between rural types (totally rural versus urbanized) disappear when the effects of local government responsibilities, income levels, and tax importing and exporting are netted out. Still, many of the differences among regions and types of rural areas remain after these potential distortions are netted out. Thus, the basic findings of this report are valid.

These findings underscore the need for caution when one uses revenue effort to infer local fiscal pressure. This caveat pertains especially to inferences about individual counties. Local revenue effort may be an extremely misleading indicator of fiscal pressure in counties with particularly high or low levels of local government responsibilities, incomes, or tax exporting and importing.

Only a third of the variation in local revenue effort was "explained" by the factors examined in this regression analysis. Other factors which might affect local revenue effort are exceptional public service needs, extraordinary tastes and preferences for public-sector services, State and local limitations (or the lack of limitations) on local revenues, expenditures, and debt, and heavy reliance on volunteer workers to provide public services. Some of these factors may also cause revenue effort to overstate or understate local government fiscal pressure.

IMPLICATIONS

The indicators of revenue effort presented in this report highlight the diverse fiscal problems facing rural America. Rural areas have historically suffered from uniquely rural fiscal problems associated with diseconomies of small population size and with population and income decline. However, as most rural areas have grown in recent years, many communities have become more urban. These developments have led many rural government researchers to examine the problems of fiscal adjustment related to population growth, economic recession, and other issues traditionally associated with urban areas. But if one judges from their high and rising revenue effort, the most rural nonmetro areas--many of which still suffer from population and income decline--have pressing fiscal problems.

Totally rural areas are twice as likely to have high and rising revenue effort as urbanized nonmetro areas are. Nonadjacent, totally rural areas have the most fiscal pressure. Compared with urbanized nonmetro areas, they were eight

times as likely to have very high levels of revenue effort and seven times as likely to have rapidly rising effort. Although tax exporting seems to exaggerate these measures of fiscal pressure, especially in totally rural areas, it only partly accounts for their high revenue effort. Furthermore, many highly rural areas are in the South, where low incomes tend to deflate revenue effort.

Rising revenue effort was associated with population and income decline from 1972 to 1977. Effects of population change were greatest in the West, where revenue effort rose by 1.7 percent of income in declining areas compared with only 0.3 percent in growing areas. Population decline also contributed to rising effort in totally rural areas. Among less rural areas, effort generally declined, and effort trends differed little between growing and declining areas. For nonmetro areas, declining real income was the more important factor explaining growing fiscal pressure. Revenue effort in the average nonmetro county in the declining-income category increased by 2.0 percent of income, compared with a 0.4-percent decrease in the income-growth category.

In formulating policies to help fiscally distressed rural communities, therefore, policymakers should be aware of the unique relationship between population decline and fiscal stress in highly rural areas. This problem seems to be associated with diseconomies of small population size and density. Diseconomies in declining, sparsely populated areas may be particularly severe in the West, where fiscal pressure is greatest. Thus, Federal and State policymakers should be concerned with the fiscal problems of highly rural areas, and their policies should address small size diseconomies, whenever possible. Policymakers should recognize that places suffering from income decline experience fiscal pressure associated with rising revenue effort. This situation may make it difficult for local governments in areas experiencing economic decline to reverse their economic fortunes through economic development policies that are locally financed.

With regard to the frostbelt-sunbelt debate, extreme forms of nonmetro fiscal stress occur primarily in the West and to a lesser extent in the South. Although Southern fiscal problems manifest themselves chiefly in rising revenue effort, Western rural areas are more likely to have both high and rising effort. Although a relatively large share of the nonmetro population in the Northeast resides in areas with high and rising revenue effort, the fiscal situation appears bright for most nonmetro areas in the frostbelt. This perspective differs from that ordinarily associated with sunbelt-frostbelt comparisons of urban stress. Federal policymakers should consider these distinctions when dealing with the sunbelt-frostbelt issue.

Revenue effort is generally a useful measure of fiscal pressure in comparisons among rural areas and regions. However, I found significant distortions associated with tax exporting and importing, low income, and local government responsibility for public services. Heavy tax exporting and importing appear to exaggerate the revenue effort of highly rural areas and the rural West, overstating the fiscal pressure on these areas. Low incomes depress revenue effort in highly rural areas and in the rural South, thus understating the fiscal pressure in these areas. Relatively low responsibilities of local governments reduce the revenue effort of rural areas in the South and West, also understating fiscal pressure. While these distortions do not alter the main findings of this report, one should be cautious when interpreting revenue effort in individual counties as an indicator of fiscal pressure, because the distortions associated with individual counties may be particularly misleading.

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STATISTICAL APPENDIX: REGRESSION ANALYSIS

This appendix presents a series of multiple regressions designed to identify and separate out the effects of tax exporting, tax importing, low incomes, and State revenue responsibilities. I computed four regressions using 2,400 U.S. nonmetro county areas (excluding Alaska). The dependent variable in each regression is 1977 revenue effort (local own source general revenues as a percentage of resident personal income). Independent variables are defined in appendix table 1. The estimated regression coefficients for each regression are presented in appendix table 2. The appendix concludes with a brief discussion of another regression examining the change in revenue effort from 1972 to 1977.

The first regression includes only the five regional and rural classification variables, which are zero-one dummy variables representing the South, West, Northeast, totally rural, and urbanized classifications. 1/ Because variables associated with economic base, metro dependency, income, and State government revenue responsibility are left out of this regression, one may view the regression as misspecified and the rural and regional variable coefficients as distorted (or biased).

The extent of the bias is clearest if one compares the biased rural and regional coefficients in the first regression with the unbiased coefficients from the correctly specified fourth regression, which separates out the effects of variables representing tax exporting and importing, income level, and local government responsibilities. 2/ Bias is most noticeable for the Southern dummy variable, whose coefficient falls markedly from -1.96 in the first regression to -0.51 in the fourth regression. This change implies that factors excluded in the first regression cause Southern revenue effort to be understated by 1.45 percent of income. Northeastern effort is also understated, but to a much smaller degree. In contrast, Western revenue effort is overstated by 0.35 percent of income. 3/ Thus, the revenue effort gap between South and West is substantially exaggerated (almost doubled) because of bias inherent in simple uncorrected comparisons.

Bias also exaggerates the gap between totally rural and urbanized areas. The coefficient for totally rural areas declines from 1.19 in the first regression to 0.92 in the fourth regression. This decline implies that fiscal pressure in

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1/ Dummy variables representing the North Central region and the less urbanized nonmetro classification are intentionally excluded to avoid statistical problems of multicollinearity.

2/ The terms unbiased and correctly specified are used only in a relative sense in reference to the fourth regression. This regression remains misspecified to the extent that other important variables may be excluded. For example, highly rural areas are more likely to use volunteer workers than less rural areas. Because the necessary data are not available, no variable representing volunteer effort could be included in the regression; hence, the totally rural regression coefficient remains biased as an indicator of fiscal pressure.

3/ Statistical reasons prevented the inclusion of a North Central variable in the regression. The coefficients for each of the regions must be interpreted as deviations from that of the North Central region. Although this procedure complicates assessing the bias associated with this region, one can conclude from the opposite directions of the bias for the West and South that the magnitude of bias for the North Central region is not large.

Appendix table 1—Variable description

Variable	Definition	Unit	Mean	Standard deviation
SOUTH	0,1 dummy variable	South = 1	0.45	0.49
WEST	0,1 dummy variable	West = 1	.14	.35
NORTHEAST	0,1 dummy variable	Northeast = 1	.05	.21
TRURAL	0,1 rural dummy variable	Totally rural = 1	.35	.47
URBANZ	0,1 rural dummy variable	Urbanized = 1	.13	.33
PCINCOME	Resident personal income per capita 1/	Thousand	5.5	1.2
FARMP	Farm proprietor employment 1/	Percent of total local employment	14.4	10.2
FARMNP	Farm nonproprietor employment	Do	4.8	5.2
NFARMAG	Nonfarm agricultural employment	Do	.6	1.0
MINING	Mining employment	Do	2.4	6.3
MANUFAC	Manufacturing employment	Do	15.8	12.7
RETAIL	Retail employment	Do	10.7	3.9
SERVICE	Services employment	Do	11.6	5.9
ADJ	0,1 dummy variable	Metro adjacent = 1	.4	.5
STATESH	State share of State-local own general revenues, average for State	Percent	57.7	7.4
EFFORT 2/	Own source general revenue effort	Percent of income	6.3	3.8

1/ 1977 income, population, and employment data from U.S. Department of Commerce, Bureau of Economic Analysis.
2/ Dependent variable in regressions.

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Appendix table 2--Regression coefficients

Independent variables1/	First regression	Second regression	Third regression	Fourth regression
		Coefficient		
SOUTH2/	-1.96*	-1.53*	-1.66*	-0.51*
WEST2/	1.82*	1.87	.97*	1.47*
NORTHEAST2/	-.10	.11	.51*	.55*
TRURAL2/	1.16*	1.39*	.99*	.92*
URBANZ2/	-.37	-.61*	-.29	-.14
PCINCOME	--	4.91*	2.74*	1.63*
FARMP	--	--	-.01	-.01
FARMNP	--	--	.16*	.16*
NFARMAG	--	--	.29*	.09
MINING	--	--	.05*	.06*
MANUFAC	--	--	-.02*	-.02*
RETAIL	--	--	.08*	.09*
SERVICE	--	--	-.02*	-.03*
ADJ2/	--	--	-.52*	-.59*
STATESH	--	--	--	-.17*
CONSTANT	6.61	3.64	4.23	13.83
R-SQUARE3/	.15	.17	.25	.33

--Indicates variable was not in regression.
* Indicates coefficients which are statistically significant at 99-percent confidence level.

1/ The dependent variable is 1977 own general revenue effort.
2/ Zero/one dummy variables are used for region, rural, and metro adjacent classifications. The North Central, independent, and medium rural classifications are excluded to avoid multicollinearity.
3/ Adjusted R square statistic.

totally rural areas is overstated if one uses simple revenue effort. The coefficient for urbanized areas rises from -0.37 to -0.14, implying that revenue effort understates the fiscal pressure in these areas. The net result is that bias overstates the gap between the two by 0.47 percent of income.

The series of four regressions can be viewed as a progression. The first regression is uncorrected for bias. The second regression nets out the effect of low income by adding per capita income as an explanatory variable in the regression. The third regression is like the second, except that it nets out the effects of tax exporting (by adding economic base variables) and importing (by adding a metro-adjacency variable). 4/ The fourth regression is the same as the third, except that it also nets out the effect of State revenue responsibility by adding a revenue responsibility variable to the regression. 5/ The coefficent change from one regression to the next may be used to indicate the separate effects associated with each kind of bias.

Between the first and second regressions, for example, the increase from -1.96 to -1.53 in the coefficient for the South implies that low incomes in the South understate revenue effort by 0.43 percent of income (other things being equal). 6/ By far the largest increase in the coefficent for the South, however, is associated with the fourth regression, which includes the variable for State revenue responsibility. Apparently, Southern nonmetro areas have low local revenue effort mainly because large State revenue responsibility is common to the region.

The overstatement of revenue effort in the West seems to result primarily from tax-exporting (and tax-importing) bias, which is implied by the decrease in the

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4/ The potential for tax exporting is thought to be a function of the local economic base. Economic base is represented by the percentage of local employees in five major industrial classifications: agriculture, mining, manufacturing, retail, and services. Agriculture is broken down into three categories: farm proprietors, nonfarm agricultural employees, and farmworkers. Of these three, tax exporting is expected to be most important where hired farmworkers are relatively important to the local economy. In such places, there may be greater potential to export property taxes to nonresident proprietors, and sales taxes and user charges to migrant farmworkers. Retail businesses are expected to export taxes to nonresident consumers visiting retail sales centers. Mining industries are expected to export property and severance taxes to nonresident consumers and stockholders in other States. Manufacturing industries can export taxes either to consumers or to stockholders, both of whom are likely to be nonresidents. Hotel and motel services, included in the services industrial classification, export taxes to tourists. Hence, positive regression coefficients were expected for these variables.

5/ The variable added in the fourth regression is the State share of State-local own general revenues. The State share was computed for each State based on all local governments within the State, and this share was attributed identically to each nonmetro county area within the State. This percentage share variable is expected to be inversely related to local revenue effort as a higher State share implies higher State tax burdens and, therefore, more pressure to lower local taxes.

6/ As noted before, a separate variable for the North Central region is not included in the regression. The coefficients for the other regions must, therefore, be interpreted as deviations from that of the North Central region. This means that the terms understate and overstate are used here in a relative, rather than an absolute, sense--that is, relative to the North Central region.

coefficent for the West from 1.82 in the second equation to 0.97 in the third equation. Although this source of bias increases Western revenue effort by almost 1 percent of income, about 0.5 percent is offset when the relatively low revenue responsibilities for the Western States are included in the fourth regression.

The coefficient for the Northeast increases with each subsequent regression; thus, each type of bias causes Northeastern revenue effort to be understated slightly, compared with North Central effort (the unspecified control region). The largest bias for the Northeast is associated with tax exporting, indicated by the coefficient increase from 0.11 in the second regression to 0.51 in the third regression.

After the effects of all of these variables which are thought to distort revenue effort comparisons are netted out, significant variation in regional effort remains. 7/ From the fourth regression, which is corrected for bias, one can see that the positive regression coefficient for the Northeast is larger in absolute value than the negative coefficient for the South. Hence, after bias factors are netted out, revenue effort in the North Central region (the control in the regresssion) is more similar to low effort in the South than to higher effort in the Northeast. The high effort in the West is at the opposite end of the scale from the low effort in the South, as one can see from the coefficients for the West and South in the fourth regression. This finding is interesting because it suggests the fiscal differences between the sunbelt and frostbelt may be less important than the regional differences within each category.

The fourth regression also shows the relative importance of the State revenue responsibility variable which, when added to the other variables in the regression, increases the explained variation (R-SQUARE) from 25 to 33 percent. This finding suggests that interstate comparisons of local effort may be heavily biased. In terms of the addition to explained variation, the extent of the bias is equivalent to that of tax exporting (and importing).

The relative importance of the individual tax-exporting variables deserves mention. The most important tax-exporting factor, judged from the size of the regression coefficients in the fourth regression, is the farmworker variable (FARMNP), followed by the retail and mining variables. 8/ The negative coefficients for the manufacturing and services variables are surprising. Rural areas compete for manufacturing establishments in a way that one might expect them to export taxes and thereby add to local revenue effort.

Likewise, many service establishments, such as hotels and motels, tax nonresidents and thereby add to local effort. The surprising negative coefficients may occur for any number of reasons. One possible explanation for the manufacturing coefficient is that manufacturing companies locate new plants in low tax areas and bargain for tax concessions. The services coefficient may result from private schools, hospitals, and other private-sector services which may actually substitute for services otherwise provided by local governments.

7/ An F-test for statistical significance of explained variation found that the regional variables were statistically significant at the 99-percent confidence level.

8/ Nonfarm agricultural employment is ignored because it is not statistically different from zero.

The most important observation is the effect of distortionary factors on the gap in revenue effort between totally rural and urbanized areas. The totally rural coefficient increases substantially from the first to the second regression, suggesting that low incomes depress revenue effort in totally rural areas. Urbanized areas have higher incomes which add to their revenue effort, as shown by the decline in the urbanized coefficient between the first and second regressions. Although adjusting for this source of bias appears to increase the gap between the two, the gap is reduced when the effects of tax exporting and importing are netted out, as is indicated by the change in the two coefficients from the second to the third regression. Adjusting for this kind of bias results in a 0.4-decrease in the totally rural coefficient and a 0.32-increase in the urbanized coefficient. Although the net effect of these distortionary factors is to exaggerate the effort gap between totally rural and urbanized areas, most of the gap appears to be unrelated to bias factors. 9/ One should not overlook the fact that the regional and rural factors and the distortionary factors explain only 33 percent of the variation in nonmetro revenue effort, as indicated in the R-SQUARE statistic for the fourth regression. This means that most of the variation in local effort relates to other factors--economic, political, and social. Therefore, research is needed on the causes for variations in revenue effort.

I used a similar regression approach to explain variations in the change in effort from 1972 to 1977. The regression was not powerful; only about 15 percent of the variation was explained, and the results are not presented here. However, there were several notable findings. As expected, population decline was positively related to growth of local revenue effort. Some economic base variables, such as the growth of mining and nonfarm agricultural employment, also contributed significantly to growing revenue effort in nonmetro areas.

The most important explanatory variable in this regression was the change in per capita income, which was inversely related to the change in revenue effort. This inverse relationship seems to contradict the earlier finding that effort level (in 1977) was directly related to per capita income level (in 1977). Two possible explanations arise. First, the 1972-77 change in income may be transitory rather than permanent. For example, fluctuations in agricultural prices do not represent permanent changes in income for farming communities. Thus, local government revenues and expenditures may be maintained at roughly the same levels despite a substantial increase or decrease in income, causing revenue effort to rise or fall in the short run. Second, the income change may be permanent, but there may be a time lag in the adjustment of taxes. In either case, changes in revenue effort would be expected to vary inversely with income changes in the short run, but not in the long run. Hence, there is no real contradiction.

It is interesting that when the income change variable is included in the regression, the difference between the growth of effort in the West and the South disappears, and the difference between totally rural and urbanized areas is cut in half. Nevertheless, significant differences between the sunbelt and frostbelt and between highly rural and less rural areas remain after one accounts for changes in population, income, and economic base.

9/ An F-test showed totally rural and urbanized variables were statistically significant at the 99-percent confidence level.

OTHER REPORTS OF INTEREST ON RURAL ISSUES

Patterns of Change in the Metro and Nonmetro Labor Force, 1976-82 reveals that nonmetro areas, particularly farm areas, lagged behind metro areas in employment growth during the 1976-82 period. This reversed a pattern of faster nonmetro growth occurring in the late sixties and early seventies. RDRR-44. December 1984. 28 pp. $2.00. Order SN: 001-019-00358-8.

Counting Hired Farmworkers: Some Points To Consider concludes that as many as two-thirds of the Nation's hired farmworkers may not have been counted in the 1980 Decennial census farm labor categories because they were not working on farms in March when the data were collected. Data from USDA's 1981 Hired Farm Working Force Survey suggests that the farm labor census data are more likely to describe workers employed in hired farmwork year round. AER-524. December 1984. 16 pp. $1.00. Order SN: 001-019-00367-7.

Distribution of Employment Growth in Nine Kentucky Counties: A Case Study shows that people moving to a nonmetro area held a disproportionate share both of jobs in growing business establishments and of better paying executive jobs. Manufacturing was the study area's major economic driving force, but the private service sector (which provided services to the manufacturing sector and to the area's growing population) was an important contributor to job growth between 1974 and 1979. RDRR-41. August 1984. 44 pp. $2.25. Order SN: 001-019-00337-5.

Chartbook of Nonmetro-Metro Trends is a quick check on metro and nonmetro socioeconomic trends. It presents colorful charts, tables, maps, and text tracing differences in population, employment, income, poverty, housing, and government between nonmetro and metro America. RDRR-43. September 1984. 48 pp. $2.50. Order SN: 001-019-00351-1.

Housing of the Rural Elderly finds that the number of rural elderly households rose 16 percent between 1974 and 1979 compared with a 10-percent increase for all U.S. households, based on the 1979 Annual Housing Survey. Most of the U.S. elderly live in adequate housing, but 27 percent of the elderly renters and 18 percent of all elderly living in the South have inadequate housing. In 1979, 15 percent of the rural elderly lived in adequate housing compared with 8 percent of the urban elderly. RDRR-42. July 1984. 20 pp. $1.50. Order SN: 001-019-00335-9.

Immigration Reform and Agricultural Labor assesses effects of recent legislation proposing that farm employers hire either American workers or legal foreign workers. Labor-intensive farms, particularly in vegetable- and fruit-growing States such as California and Florida, would be most affected by this legislation. AER-510. April 1984. 36 pp. $2.00. Order SN: 001-000-04411-7.

The Hired Farm Working Force of 1981 examines characteristics and earnings of about 2.5 million hired farmworkers 14 years of age and older. Migrant workers account for only about 5 percent of all hired farmworkers. Includes over 30 tables. AER-507. November 1983. 64 pp. $2.00. Order SN: 001-000-04370-6.

A Profile of Female Farmers in America discusses social and economic characteristics of female farmers, including age, race, size of household, farm and off-farm income, types of farms female farmers most frequently run, and value of agricultural products sold. Although the number of U.S. farms is dropping, the number of female farmers is rising. They tend to run smaller farms and earn less than their male counterparts. RDRR-45. January 1985. 32 pp. $1.50. Order SN: 001-019-00378-2.

*U.S. GOVERNMENT PRINTING OFFICE:1985-460-941:20109-ERS

Do Bank Size and Metro-Nonmetro Location Affect Bank Behavior? shows that a bank's lending policies and its aggressiveness in attracting large deposits depend more on the size of the bank's assets than on its rural or urban location. Many rural banks do, however, take fewer risks than do urban banks, principally because of the small value of their assets rather than because of their location. April 1985. 20 pp. $1.00. Order SN: 001-019-00392-8.

Physicians in Nonmetro Areas During the Seventies shows that the gap between the number of physicians in nonmetro and metro areas widened during the seventies, with nonmetro areas lagging by almost 100 physicians per 100,000 population. This report describes availability of physicians in nonmetro areas in light of population changes and demand for medical care. RDRR-46. March 1985. 28 pp. $1.50. Order SN: 001-0-19-00380-4.

Farm Population Trends by Farm Characteristics, 1975-80 finds that the number of persons living on larger farms jumped 67 percent between 1975 and 1980, while smaller and midsize farms together lost about 20 percent of their population. Despite the heaviest rates of population loss, smaller farms still contain about half of the U.S. farm population. Midsize farms lost about 7 percent of their population during 1975-80 but still contain nearly 33 percent of the U.S. farm population. Although the number of persons living on larger farms increased substantially, they only account for 18 percent of farm residents. RDRR-40. February 1984. 48 pp. $2.00. Order SN: 001-019-00333-2.

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